Network Working Group
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NIC: 729

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TELNET Byte Macro Option

1. Command name and code:

   BM 19

2. Command Meanings:

   IAC WILL BM

   The sender of this command REQUESTS or AGREES to use the BM option, and will send single data characters which are to be interpreted as if longer data strings had been sent.

   IAC WON'T BM

   The sender of this option REFUSES to send single data characters which are to be interpreted as if longer data strings had been sent.

   IAC DO BM

   The sender REQUESTS or AGREES to have the other side (send of WILL BM) issue send single data characters which are to be interpreted as if longer data strings had been sent.

   IAC DON'T BM

   The sender REFUSES to allow the other side to send single data characters which are to be interpreted as if longer data strings had been sent.

   IAC SB BM <DEFINE> <macro byte> <count>
   <expansion string> IAC SE

   where:

   <macro byte> is the data byte actually to be sent across the network; it may NOT be Telnet IAC (decimal 255).

<count> is a one-byte binary number, indicating how many <expansion string> characters follow, up to the ending IAC SE, but not including it.

<expansion string> is a string of one or more Telnet ASCII characters and/or commands, which the <macro byte> is to represent; any character may occur within an <expansion string>.

The indicated <macro byte> will be sent instead of the indicated <expansion string>. The receiver of the <macro byte> (the sender of the DO BM) is to behave EXACTLY as if the <expansion string> of bytes had instead been received from the network. This interpretation is to occur before any other Telnet interpretations, unless the <macro byte> occurs as part of a BM subcommand; in this case no special interpretation is to be made.

Note that the effect of a particular <macro byte> may be negated by reseting it to "expand" into itself.

<DEFINE> is decimal 01.

IAC SB BM <ACCEPT> <macro byte> IAC SE

The receiver of the <DEFINE> for <macro byte> accepts the requested definition and will perform the indicating expansion whenever a <macro byte> is received and is not part of a BM subcommand.

<ACCEPT> is decimal 02.

IAC SB BM <REFUSE> <macro byte> <REASON> IAC SE

The receive of the <DEFINE> for <macro byte> refuses to perform the indicated translation from <macro byte> to <expansion string> either because the particular <macro byte> is not an acceptable choice or because the length of the <expansion string> exceeds available storage.

<REFUSE> is decimal 03.

<REASON> may be

<BAD CHOICE> which is decimal 01; or

<TOO LONG> which is decimal 02.

IAC SB BM <LITERAL> <macro byte> IAC SE

The <macro byte> is to be treated as real data, rather than as representative of the <expansion string>

<LITERAL> is decimal 03.

3. Default:

WON'T BM -- DON'T BM

No reinterpretation of data is allowed.

4. Motivation for the option:

Subcommands for Telnet options currently require a minimum of five characters to be sent over the network (i.e., IAC SB <Option name> IAC SE). For sub-commands which are employed infrequently, in absolute numbers and in relation to normal data, this overhead is tolerable. In other cases, however, it is not. For example, data which is sent in a block-oriented fashion may need a "block separator" mark. If blocks are commonly as small as five or ten bytes, then most of the cross-net data will be control information. The BM option is intended as a simple data compression technique, to remove this overhead from the communication channel.

5. Description of the option

The option is enabled through the standard Telnet Option negotiation process. Afterwards, the SENDER of data (the side which sends the IAC WILL BM) is free to define and use mappings between single and multiple NVT characters. Except for the ability to offer a blanket refusal, the receiver of data has no control over the definition and use of mappings.

The sender (of the WILL BM) is prohibited from using or redefining a <macro byte> until it has received an <ACCEPT> or <REFUSE>, in reply to a <DEFINE>.

NOTE: The Telnet command character IAC (decimal 255) may be a member of an <expansion string> but is the ONLY character which may NOT be defined as a <macro byte>. ALL OTHER Telnet command characters use IAC as a preface and therefore occupy a SEPARATE portion of the data space than do regular data

bytes.

With the exception of IAC, data transfered as part of BM subcommands are NOT to be interpreted. They are to be taken only as their normal character values. This avoids the problem of distinguishing between a character which is to be taken as a <macro byte>, and interpreted as its corresponding <expansion string>, and that same character to be taken as its usual Telnet NVT value. In all other cases, however, <macro byte>s are to be interpreted immediately, as if the <expansion string> had actually been sent across the network. Expanded strings are not subject to reinterpretation, so that recursive definitions cannot be made.

The <count> in the <DEFINE> subcommand allows the receiver to allocate storage. IAC interpretation is not over-ridden during BM subcommands so that IAC SE will continue to safely terminate malformed subcommands. To include IAC as part of a <DEFINE>, the string "IAC IAC" must be sent.

The BM option is notably inefficient with regard to problems during <macro byte> definition and use of <macro byte>s as real data. It is expected that relatively few <macro byte>s will be defined and that they will represent relatively short strings. Since the Telnet data space between decimal 128 and decimal 254 is not normally used, except by implementations employing the original Telnet protocol, it is recommended that <macro byte>s normally be drawn from that pool.